

Highlights

- Expanding roles of the community pharmacist has exposed the requirement to integrate effective business management skills within the profession.
- Pharmacy stakeholders and students agree that human domain skills are the most prominent business management category required by community pharmacists.
- Pharmacy students are interested in business management and perceive managerial skills are required for a pharmacist.
- The pharmacy profession may benefit from training in human resources as human skills represent the greatest proportion of managerial skills required for the role.

Scoping the required business management skills for community pharmacy: Perspectives of pharmacy stakeholders and pharmacy students

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Contribution to the literature

Community pharmacist management has become a prominent area of interest due to the expanding roles of the profession. This scoping review explores the literature on the business management skills either community pharmacy stakeholders or pharmacy students perceive are required for the role of a community pharmacist. There are a limited number of publications defining the management skills required for a community pharmacist. Studies have primarily focused on ranking the most important skills, evaluating different teaching methods or discovering knowledge gaps in recent graduates. While individually these studies are limited, together they offer a more holistic view of identifying the management skills required for a community pharmacist. This scoping review makes a valuable contribution to the literature by revealing the range and description of management skills community pharmacy stakeholders and students perceive are required for a community pharmacist. The novel approach to extract and identify community pharmacist management skills was delivered in a conceptual, human or technical business framework.

Disclosure

None.

Declaration of competing interest

None.

Abstract

Background

Industry vision for the community pharmacist is prioritising professional healthcare services. Successful transition into this role includes improving community pharmacist training and confidence in effective business management. The literature is dearth in identification and categorisation of business management skills community pharmacists require. Community pharmacy stakeholders (comprising predominantly of community pharmacy owners, managers and pharmacists) and pharmacy students are a valuable source of knowledge for identifying business management skills.

Methods

Eight electronic databases were searched for published articles, with titles and abstracts screened according to inclusion criteria. Full articles meeting the criteria specified were assessed and skills identified were mapped to the human, conceptual and technical skills of a business management framework.

Results

Pharmacy stakeholders and students identified thirty-six business management skills/aptitudes required for community pharmacists. Pharmacy stakeholders identified most frequently the skills of communication, professionalism, general business management, leadership and teamwork. Although the pharmacy students concurred with many of these skills, they more frequently identified confidence, entrepreneurship and having prior experience or opportunity in a management role. A substantial number of identified skills/aptitudes are categorised under the human domain of the business management framework.

Implications

Community pharmacists require training and confidence in effective business management, with particular emphasis on human domain skills. The tertiary education system should consider implementing the skills/aptitudes revealed in this review into the pharmacy curriculum. Recruiting and integrating business minded personalities into the profession, particularly targeting students with an attraction to business management, is one strategy to improve management skills within the industry.

Keywords

leadership; pharmacy manager; business; managerial skills; pharmaceutical education; chemist; training; tertiary education.

Background

The role of a community pharmacist is viewed as a blend between business manager and healthcare provider.¹⁻⁵ Throughout the evolution of the profession, there has been a cultural trend to favour and emphasise the clinical role.⁵⁻⁷ Focus on the patient in pharmacy has continued through to the late 20th and early 21st century, with expansion of both clinical skills and services provided.⁸⁻¹⁴ This expansion was in part catalysed by the foundation paper published in 1990 by Hepler and Strand: '*Opportunities and Responsibilities in Pharmaceutical Care*'.¹⁴ This paper called for patient-focused outcomes to highlight the unique role of the pharmacist in the health care sector. Subsequent to this, the pharmacy profession became dominated by the clinical role and the expansion of services, whilst the pharmacy management role received little attention.^{3,15} The community pharmacist is part of a dual natured profession that requires mastering both clinical and business management skills.^{1,3,16} Globally the tertiary education system acknowledges the dual nature of the profession,¹⁶⁻²⁰ and in Australia pharmacy students are required to be trained with the business management skills to prepare them for a career in community pharmacy.²¹

The community pharmacist has expanded their role from that of the traditional apothecary, to focus on the patient, trained to deliver an array of clinical service's (e.g. immunisations).^{8,14,22-31} The expansion of the professional role has in fact created opportunities for the pharmacists to use their business skills to embrace the changing market and show innovation to implement financially viable business models prioritising clinical service.^{25,32-35} Community pharmacy has endeavoured to re-professionalise towards a service-based industry due to a number of factors including public expectation^{10,36,37} and the increase in market competition.^{25,38-40} There is the expectation that pharmacists possess the training in management skills to lead the profession away from a business dependent on dispensing medicines and adapt to a professional patient-focussed business model^{16,41,42}. However, the core business of community pharmacies remains dispensing high volumes of prescriptions with increasingly unprofitable margins, which is combined with a lack of funding and innovation in adapting to a clinical service-based pharmacy.^{27,43-49} Consequently, there has been a rapid rise in the number of studies researching business management in community pharmacy.^{1,4,16,19,50,51}

Universities have recognised the evolving profession of a community pharmacist and the increased importance business management as the industry struggles to adapt to environmental changes.^{4,19,42,51,52} Studies have revealed potential explanations for the lack of skilled pharmacy management in the profession and as such the teaching methods for business management during the pharmacy curriculum have been investigated.^{4,18,51-53} Of particular concern is the classic method of didactic teaching, where students have revealed rote learning the answers, 'dumping' the knowledge and consequently displaying limited confidence when required to apply the business management skills.^{16,19} This knowledge has guided a number of tertiary educators to trial innovative mixed method teaching to better equip pharmacy students with business management skills.^{41,42,54} These experimental teaching methods have delivered promising results but require further knowledge of the management skills specific for pharmacy. Describing the range and type of business management skills that are required for a community pharmacist is a growing area of research.^{1,20,50} Many of the previous studies in the area of pharmacy management have focussed on identifying knowledge gaps that exist in either recent graduates or newly registered pharmacists.^{55,56} Whilst helpful at highlighting areas of improvement for the curriculum, these studies have failed to reveal the complete scope of business management skills required in community pharmacy due to a lack of an overview of the range of business skills and their potential importance.^{18,19,53,57}

Revealing the complete range and description of the skills required in pharmacy management would make a valuable contribution to the profession.^{25,49} Existing studies primarily aim to rank the most important management skills, highlight knowledge gaps or improve teaching methods in recent graduates.^{20,55,56,58,59} While individually these studies are limited, together they offer a more holistic view of identifying the management skills required for a community pharmacist. This scoping review thus aims to explore the perceptions of pharmacy stakeholders and students in relation to the business management skills required for a community pharmacist. This is a novel approach to fill a knowledge gap in the community pharmacist management literature and will be illustrated against a conceptual, human or technical business framework.⁶⁰

Methods

Search strategy

A scoping literature review following the preferred reporting items for systematic reviews and meta-analyses extension for Scoping Reviews (PRISMA-ScR) was conducted in July 2020 based on the 6 stages of the Arksey and O'Malley scoping review framework.⁶¹ ABI/Inform, CINAHL, Emerald/Insight, ERIC, MEDLINE Ovid, Web of science (WOS), and Google Scholar were searched using a derivation of the following keywords: ((MH "Students, Pharmacy") AND (MH "Pharmacist Attitudes") AND (MH "Pharmacy Service") AND (MH "Pharmacists") AND (MH "Education, Pharmacy")) AND management skills. The search strategy for each database is specified in Appendix 1. There were no restrictions imposed on the dates or literature types placed on any of the database searches.

Citation details of potential publications, generated from the search strategy, were recorded (authors, literature title, journal source, year of publication, country of origin, and relevant page numbers) and an abstract screening conducted to determine if an article fulfilled the inclusion criteria. Articles consisting of the same title and abstract were considered a duplicate and removed from the search. To ensure all relevant articles were included in this review, the reference list of potential publications was screened to highlight studies missed during the database searches. Google Scholar was used to source and screen each potential publication from the reference list, with the inclusion criteria being applied to determine if the study could be included in this review.

Inclusion and exclusion criteria

The studies remaining, based upon the initial abstract screening, were rigorously investigated by a full-text reading to ensure relevance to the research question: What are the perspectives of pharmacy stakeholders or students of the skills and aptitudes required for business management in community pharmacy? To be included in this review, relevant studies had to be in English, entire text published articles and include the identification of a business management skill required for a community pharmacist. Studies were only included if a business management skill perceived required for a community pharmacist was identified from a pharmacy stakeholder (pharmacy owner, pharmacist manager, community pharmacist, pharmacist employer, pharmacy academic, pharmacist preceptor) or undergraduate pharmacy student (university student inclusive from year one to the level of pre-registration pharmacist).

After an extensive screening of the literature, exclusion criteria were applied. Studies were excluded if they did not relate to the research question of the scoping review or business management in community pharmacy (e.g., papers specifically related to hospital pharmacy, industry, drug trials, and board meetings). Other excluded studies contained those where a business management skill was

being identified by a non-pharmacy stakeholder or student (e.g., business management academic or specifically focussed on hospital pharmacists), the study was a literature review, study piece, unpublished thesis, and opinion article. Two authors consulted on the full-text articles for inclusion/exclusion to resolve uncertainty at this stage.

Categorisation and quality assessment of the studies

The studies included in the scoping review (Figure 1) were included in a table by author, country, aim(s), methodology, findings, skills and aptitudes (Table 1 and Table 2). Each business skill or aptitude perceived to be required by a community pharmacy stakeholder or student was identified from survey responses, interviews or focus groups transcriptions (Appendix 2). These were then categorised into three domains based on Katz's managerial skills framework;^{60,62} conceptual, human and technical (Figure 2). Due to the potential subjectivity of classification, where possible, current pharmacy management studies by Latif¹⁶ and Ram¹ were used to categorise business skills/aptitudes into one of the three domains. To assess the quality of the literature, the Newcastle-Ottawa scale⁶³ for cohort studies was employed to assign a ranking to each publication included in this review (Table 4).

Results

The search strategy generated 5146 records. After removal of duplicates and applying the inclusion and exclusion criteria, 28 studies were identified and reviewed (Figure 1).

A range of methodologies was employed for the pharmacy stakeholder studies. The publications included surveys/questionnaires 47% (n=9),^{5,17,32,51,55,58,59,64,65} interviews 26% (n=5),^{1,50,56,66,67} focus groups 5% (n=2)^{20,67} and mixed methods 5% (n=1).⁶⁸ Other journal articles included were commentaries 10% (n=2),^{16,25} and fixed-interval work sampling technique 5% (n=1).⁴⁷ Similarly, pharmacy student studies were predominantly undertaken by surveys/questionnaires 75% (n=9).^{4,17,18,51,52,56,57,69,70} Other journal articles included for this review on pharmacy students used mixed method 8% (n=1),⁵³ a case study 8% (n=1)⁷¹ and a qualitative analysis of reflection paper 8% (n=1).⁷² The literature contained in the review for both pharmacy stakeholders and students was original research published between the years 1997 to 2019.

Each publication was individually reviewed, and the authors, country in which research was conducted, aims, methodologies and findings of the studies are presented in Tables 1 and 2. Each of the 28 articles were screened for business management skills that either a pharmacy stakeholder (n=19)^{1,5,16,20,25,32,47,50,51,55,56,58,59,64-68} or student (n=12)^{4,17,18,51-53,56,57,69,70,71,72} identified as being required in community pharmacy management, with three papers including skills or aptitudes from both pharmacy stakeholders and students.^{17,51,56} Some of the skills/aptitudes identified from the studies were synonyms of each other or identified under one description (Appendix 2). In total, 36 business skills and aptitudes were extracted from the studies that either a pharmacy stakeholder or student perceived to be required for pharmacy management.

The skills/aptitudes were divided into the three domains from the business framework defined by Latif¹⁶ and Ram et al.¹ and outlined in Figure 2: conceptual, human and technical. The proportion of times a skill/aptitude was identified was calculated from a total of n=19 pharmacy stakeholder and n=12 pharmacy student publications (Table 3). Of the 36 skills/aptitudes pharmacy stakeholders or students identified, 31% (11) were classified as conceptual, 47% (17) as human and 22% (8) as technical (Figure 2). The finding that 47% of the skills/aptitudes fell within the human component of the framework is notable. Both participant groups similarly identified the skills/aptitudes categorised

under each domain of the management framework (Table 3). No other association was observed between the participant group and domain choice.

There were 5 skills/aptitudes perceived to be required for management by pharmacy stakeholders that students did not mention; business acumen and technology (technical), networking and relationship building (conceptual), stress management and affinity to role repetitiveness (human). The most frequently required skill to be identified (i.e., number of times identified relative to the total number of studies) was communication (human); 18 out of 19 (95%) pharmacy stakeholder papers^{1,16,20,25,32,47,50,51,55,56,58,59,64-68} and 9 out of 12 (75%) student papers^{4,17,18,51,53,56,57,69,71} revealed communication as a required management skill. The human domain of the management framework comprised both the greatest proportion (47%) and most frequently identified skills/aptitudes (Figure 2). Four out of the five (80%) top skills/aptitudes extracted from pharmacy stakeholder publications were all from the human domain of the framework: communication, professionalism, leadership and teamwork. Pharmacy students' perceptions showed a similar trend, with 6 out of the top 10 (60%) frequently identified skills/aptitudes categorised under the human domain. There were differences between the 2 groups in the number of times skills/aptitudes were identified in this study (Figure 2). Pharmacy stakeholders identified 8 skills/aptitudes over 30% more frequently than students; 4 skills/aptitudes from human (professionalism, leadership, teamwork and customer care), 1 skill/aptitude from conceptual (networking and relationships) and 3 skills/aptitudes from technical (professional development, business acumen and technology). Pharmacy students identified 3 skills/aptitudes more frequently than stakeholders; 1 skill/aptitude from the conceptual (entrepreneurship), 1 from the human (confidence) and 1 technical (prior experience or opportunity in business management).

All studies in this review identified management skills/aptitudes from the conceptual and human domain (Table 1 and 2). Pharmacy stakeholders were able to identify at least one technical skill/aptitude in all publications (19/19),^{1,5,16,20,25,32,47,50,51,55,56,58,59,64-68} but 47% of these studies (9/19)^{1,16,47,51,55,56,65-67} only identified a maximum of 2 technical skills/aptitudes. This trend was similar for pharmacy students, where 83% of studies (10/12)^{4,18,51-53,56,57,70,71,72} identified a maximum of 2 technical skills/aptitudes, but 58% (7/12)^{4,17,52,53,56,69,70} of the student papers did not identify a single technical domain skill categorised from the management framework. These results may be in part due to fact that the primary objective of most studies (n=25)^{4,5,16-18,20,25,32,47,51-53,55-57,59,64-72} was not to identify the skills/aptitudes required for pharmacy management. The majority of research aims in the reviewed literature could be linked to 3 main research topics: a) the skills required to be a community pharmacy manager (n=3),^{1,50,58} b) the best teaching method of business management to undergraduate students (n=12),^{4,16,18,32,51,53,57,67,69,71-73} and c) the clinical or business management skills required for graduate students and newly registered pharmacists (n=7).^{20,50,51,55,56,59,68}

Assessing the quality of articles in this study was performed using the Newcastle-Ottawa scale. For the criteria of selection, no studies in this review contained a non-exposed cohort and thus a 4 stars rating was not achievable. Studies for both stakeholders and students received 2 or 3 stars for selection, depending on how accurately each group was represented from the community. Only students received 2 stars in the criteria for comparability, with these studies comparing both different year levels and pre- and post-course work. Most articles for both groups were not comparing a distinct constituent and thus received no stars. Stakeholders were primarily assigned with 1 star for the criteria of outcome as these studies were independent blind or record linkage. Students are more accessible to follow-up post study and this was reflected in the grading of the outcome standard, with publications receiving a more even distribution of 1 and 2 stars. Table 4 summarises the quality assessment of the studies used in this review.

Implications

This review revealed that both pharmacy stakeholders and students were able to identify 36 skills/aptitudes required for business management in community pharmacy. These skills/aptitudes were categorised under the business management framework as either conceptual, human or technical.^{16,62} The top 5 frequently identified management skills/aptitudes were communication, professionalism, general business management, leadership and teamwork. Four out of these five skills/aptitudes are categorised under the human domain of the business management framework. These results align with the findings across other medical disciplines, where the requirement to integrate human skills into clinical practice is a prominent focus.⁷⁴ Effective pharmacy management in the skills/aptitudes identified in this review, is the paradigm shift for the community pharmacist to transition into a professional healthcare clinical focussed role.^{8,14,16,22–28,29–31,60,74}

A common perspective emerging is that pharmacists have limited to no training in business management and are under skilled for their role.^{3,66} All community pharmacists, whether a dispensing pharmacist, owner or manager, will have managerial elements within their roles.^{3,16} The duty of the pharmacist will dictate the emphasis placed on each component of the business framework, nevertheless, all skills/aptitudes identified will be to some extent required by every community pharmacist. Whilst this review has revealed characteristics required for pharmacy management, there is a notable trend that students and newly registered pharmacists do not have the confidence in transitioning their undergraduate management training into a community pharmacy setting.^{41,57,69,70,75} This knowledge reinforces the fact that 76% of post graduate pharmacists would have chosen business management as an elective course during their undergraduate study.¹⁷ The profession requires early career community pharmacists to be competent in the ability to perform management skills of the human and technical domain and this knowledge needs to be integrated into the tertiary education curriculum.^{17,76–78}

It is evident from this study that pharmacy students recognise the role a community pharmacist requires managerial skills. It is interesting to learn that students did not identify 5 of the business management skills/aptitudes; business acumen, technology, networking and relationship building, stress management and affinity to role repetitiveness. Potentially, students were unable to recognise these skills due to an absence from the curriculum or due to the studies not listing them as a pre-determined skill/aptitude for students to identify/rank. Recent literature supports that increased financial pressure and strain on community pharmacy profitability has expanded the role and workload of a community pharmacist.^{16,23,25,79,80} The increase in workload and pressure to dispense high volumes of prescriptions (role repetitiveness), in addition to the expectation to implement and profit from expanded remunerated clinical services (business acumen, technology) has resulted in a more stressful environment (stress management) for community pharmacists.^{23,46,56,79,81} Potentially this finding is due to students being unaware that these 5 management skills/aptitudes have become recently desirable for community pharmacists due to the expanding roles of the profession.

A primary reason community pharmacists embark on a career in pharmacy is due to the human component of the profession; the caring nature and patient focussed role.⁸² There is some evidence that undergraduate students within the degree have interest in learning the required management skills for community pharmacy, with 64% of undergraduate students having an interest in business management¹⁷. Students and newly registered pharmacists acknowledge that the profession requires predominantly human domain business skills/aptitudes, but lack confidence applying them in real-world environments.^{19,78,83,84} This would substantiate recent findings that students respond positively and gain more confidence from innovative mixed method learning of pharmacy business management.^{4,18,19,32,42,53,72} Overall this may indicate a need to change the recruitment strategy for

eligible pharmacy undergraduates and ensure these business management qualities are innately possessed by students or have a desire/affinity to developing these skills within the degree.^{7,85}

The findings of this study are significant for the community pharmacist profession, the undergraduate pharmacy curriculum, the university recruitment of students and future research in the pharmacy management field. Expansion of the community pharmacist role has revealed the profession requires a diversity of business skills, in addition to more effective business management training.^{7,11,17} This review exposed the role of the community pharmacist requires a dominance of human domain management skills. Without effective business management skills, the development and transition of the profession towards a patient focussed, clinical service-based role is more challenging. Community pharmacists, particularly recent graduates, require more training to improve confidence in effective business management skills.¹⁹ Universities offering a pharmacy degree should consider including business management as a core component of the curriculum, nurturing the skills/aptitudes found in this review. Modifying the pharmacy recruitment program to attract business minded students into the degree, particularly those with an affinity for human skills, ensures the next generation of community pharmacists will integrate effective business management into the profession.⁸⁵ Future research on pharmacy management is necessary to identify the complete range of business management skills/aptitudes required for a community pharmacist and the best method of teaching those skills/aptitudes in the undergraduate curriculum.

Strengths and limitations

There are limitations to our understanding of pharmacy stakeholder and student perceptions of business management skills. There is a dearth of literature designed to discover and explore the management skills required for a community pharmacist. Only 4 studies^{1,20,50,58} included in this review, all pertaining to stakeholders, investigated the skills required in pharmacy management. All other stakeholder publications did not have the primary aim to define the business skills required by a community pharmacist.^{5,16,25,32,47,51,55,56,59,64-68} Studies are therefore limited in their ability to reveal the complete management skills/aptitudes for a community pharmacist with any certainty. Publications regarding student's perceptions of pharmacy management are also limited by design and purpose. Student studies focussed on improving the quality of graduating pharmacists by identify gaps in student's knowledge and determining the best teaching methods.^{51,51,56,18,19} No studies found in this review contained open-ended questions regarding a pharmacy student's perceptions of the skills required for pharmacy management. Students opinions were typically identified from survey questions relating to work readiness, evaluation of pharmacy management training courses and business management knowledge.^{52,73,17,56}

Conclusion

The community pharmacist has a dual natured role, blended between healthcare provider and business management. This scoping review illuminated the diversity of business management skills and aptitudes perceived required for community pharmacy, with a clear dominance from the human domain. Industry vision for the profession is to embrace the expanding clinical roles of the community pharmacist, thus placing an increased emphasis on effective business management skills. Successful industry transition requires training to allow the profession to be competent in the business management skills/aptitudes identified in this review.

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Figures:

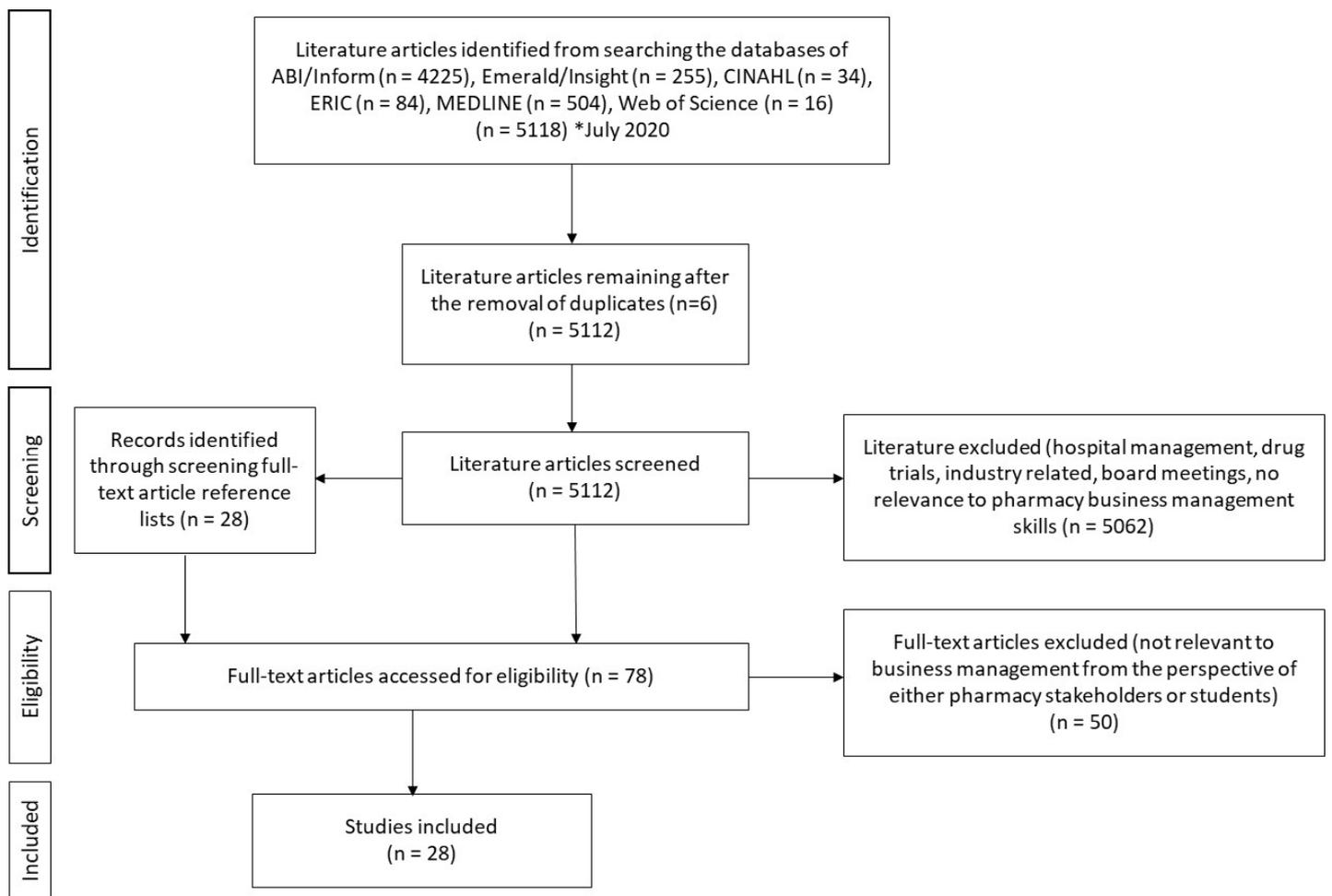


Figure 1: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR)⁶¹ flowchart for study selection process.

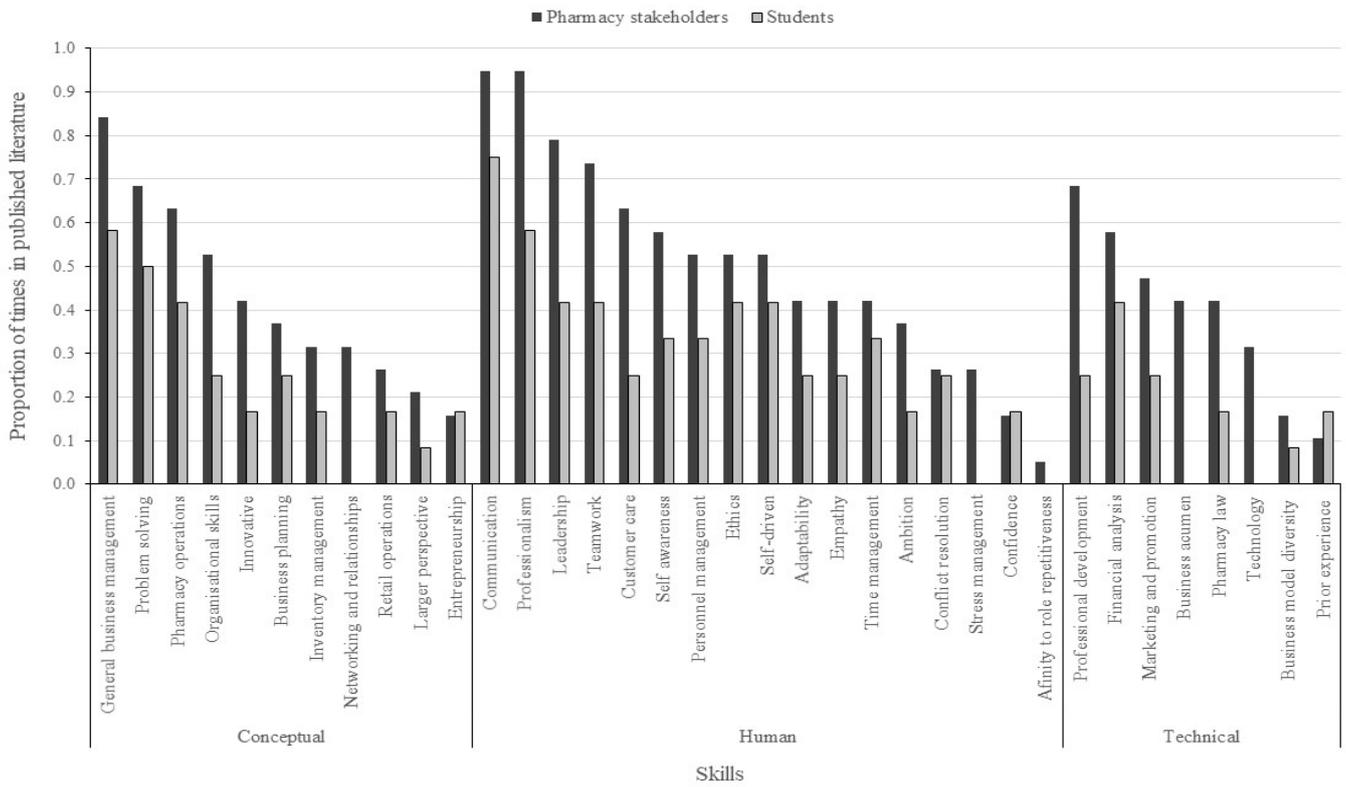


Figure 2: Proportion of time skills/apitudes were identified by either pharmacy stakeholders or students in published articles; categorised under the conceptual, human and technical domains.

1 **Tables:**

2 **Table 1:** Pharmacist stakeholders’ perceptions of skills and aptitudes required in pharmacy management. Summary rating provides an overall
 3 assessment of published articles of the skills and aptitudes required in pharmacy management as per Newcastle-Ottawa scale of assessment⁶³, see Table
 4 4 for more details.

Author(s)	Aim(s)	Methodology	Findings	Skills and aptitudes		
				Conceptual	Human	Technical
Hicks C., et al., (2004) ³² U.S.A. Summary rating: ★★★★★	To evaluate the implementation of a mixed method pharmacy management course, where pharmacy students implement a patient service into an existing pharmacy practice. The business management skills outlined in the course description and objectives was the focus of this research.	<u>Survey:</u> Students (n=62) Evaluation of course. 6 demographic and opinion questions followed by 16 statements rating the course. Reliability analysis via Cronbach’s alpha and validity tested using a rotated factor analysis with extraction.	Pharmacy students can improve their business management skills by implementing novel pharmacy services into a practice as a group project. This model highlighted the skills of leadership, law, teamwork, communication, business planning, problem solving and technology.	Pharmacy operations Problem solving General business management Entrepreneurship Business planning	Communication Leadership Team work Self-awareness	Financial analysis Technology Marketing and promotion Prior experience Pharmacy law
Fejzic J., Barker M., (2015) ⁵⁶ Australia Summary rating: ★★★★★	To discover the perceptions of pharmacists and students in regards graduate ‘work readiness’ for pharmacy practice.	<u>Interviews:</u> Pharmacist preceptors (n=92) Pharmacy preceptors (2011, 2014) described opinions on ‘work readiness.	There were similarities between pharmacists’ and students’ opinions, but there was a shift towards graduates being more work ready for business management skills to grow the pharmacy and implement innovative services.	Organisational skills Business planning Problem solving Innovation Pharmacy operations General business management	Adaptability Communication Confidence Customer care Ethics Self-driven Leadership Professionalism	Prior experience Professional development

		Responses recorded in writing. Written descriptions were thematically analysed.			Teamwork Empathy Ambition Self-awareness	
Faris R., et al., (2005) ⁵⁸ Canada U.S.A. Summary rating: ★★★★★	To investigate the perceptions of USA and Canadian pharmacists on the importance of managerial skills and self-rating of skills.	<u>Questionnaire:</u> Likert scale responses (1-5) Questions based on ranking both importance of managerial skills and to rate their own skill levels. Data analysis was performed to detect significant differences between the surveys (ANOVA) for each question. A Bonferroni adjustment was applied to the ANOVA significant levels. Post hoc test = Fisher's LSD.	Pharmacists from the USA and Canada had similarities and differences in the perceptions of management skills. Ethical conduct, communication, managing change, teamwork, leadership, pharmacy law, customer care pharmacy operations and professional development were all considered ranked important. Weakness and potential gaps in pharmacy training also had a similarity across both countries: marketing, business planning, financial analysis and business operations.	Business planning Pharmacy operations Organisational skills	Adaptability Communication Ethics Leadership Professionalism Self-driven Teamwork Self-awareness Customer care Personnel management	Business acumen Marketing and promotion Professional development Financial analysis Pharmacy law
Perepelkin J., Dobson R., (2010) ⁵ Canada Summary rating: ★★★★★	To investigate pharmacy managers in different ownership models of pharmacy, particularly identifying trends between the parameters of role orientation, role affinity and role conflict.	<u>Questionnaire:</u> Pharmacist managers (n=646) The questionnaire was designed around role organisation (scale: unimportant /important), role satisfaction (scale: like / dislike), and role experiences (scale: never / always). Statistically analysed via exploratory factor analysis. Significant differences were	Community pharmacy manager owners have an orientation towards their professional role. Independent pharmacy owners/managers have more affinity to their business role when compared to a corporate pharmacy environment. Most respondents identified being good at business, having a defined business model/structure and working as a team was important. A low level of conflict between professional and business role	General business management Pharmacy operations Organisational skills Retail operations Inventory management	Professionalism Teamwork Customer care Ethics Personnel management Conflict resolution	Business acumen Financial analysis Marketing and promotion Professional development

		calculated using frequencies, ANOVA and Scheffe post hoc tests.	was reported. Clinical roles provided a lot more satisfaction (like) in comparison to management roles (dislike).			
Davies M., et al., (2013) ¹⁷ U.K. Summary rating: ★★★★★	To study the perceptions of community pharmacists, students and academic staff within the U.K. in regards to the content and delivery of business management course in the MPharm	<u>Questionnaires:</u> Pharmacists (n=600) Academic staff (n=44) Both multiple choice (Likert scale) and open-answer questions. Data analysed by simple frequency tests, cross tabulations and non-parametric techniques.	Pharmacists (84.9%) agree business management skills are employed daily to perform their role. Academic educators (79%) agree business management skills are being prioritised in community pharmacy. Data from the study concluded business management skills are relevant in community pharmacy, should be taught in the curriculum, specifically leadership interpersonal skills and regulation.	General business management Pharmacy operations Problem solving	Communication Ethics Leadership Professionalism Self-awareness Teamwork Personnel management	Business models Financial analysis Pharmacy law Business acumen
Kairuz T., et al., (2010) ⁵⁵ New Zealand Summary rating: ★★★★★	To determine the preparedness of pharmacy graduates to enter a professional career, from the perceptions of pharmacy stakeholders (preceptors, interns and newly registered pharmacists).	<u>Questionnaire:</u> Newly registered pharmacists (n=46) Pharmacist Preceptors (n=77) Interns (n=72) 16 questions based on the Competence Standards; Likert scale (1-5) Open response for comments was included. Quantitative analysis, using Microsoft Excel pivot tables	A high level of respondents (87.6%) agreed that the degree prepared graduates for practice. Thematic analysis identified improvement was required in professional attitude, communication and management skills. Intern pharmacists perceived themselves less prepared to apply management skills in comparison to the opinion of a preceptor. Graduate students perceived themselves more ready for practice in the areas of professionalism, competence and communication when compared to preceptors.	General business management Organisational skills	Communication Confidence Customer care Ethics Self-driven Professionalism Self-awareness Teamwork	Pharmacy law Professional development

		Free-text responses analysed both quantitatively and thematically.				
Thompson D., et al., (2012) ⁵⁹ U.S.A. Summary rating: ★★★★★	To identify the characteristics pharmacist's value when hiring a new pharmacist (Rank top 5 skills).	<u>Survey:</u> Pharmacists (n=318) Respondents select top 5 most important characteristics from a list of 20. Data analysed in 3 methods; a) proportional frequency by received rank divided by population, b) 'weighting' to the rank of each characteristic (percentage), c) the methods of 'a' and 'b' analysed for sub-populations.	Communication, adaptability and professional behaviour were considered an important characteristic across all practices. Some of the differences between responses were due to the practice site or level of management responsibility that was required.	Problem solving Innovation	Adaptability Ambition Communication Empathy Self-driven Leadership Professionalism Time management Self-awareness Personnel management	Business acumen Technology Professional development
Alston G., (2017) ⁶⁵ U.S.A. Summary rating: ★★★★★	To explore the perspectives of practicing pharmacists in hiring decisions: how attributes of the Centre for the Advancement of Pharmacy Education (CAPE) 2013 influenced those decisions and the associated rank of importance.	<u>Questionnaire:</u> Pharmacists (n=3723) Questionnaire divided into 3 sections: demographics, hiring characteristics and CAPE (Centre for the Advancement of Pharmacy Educations) outcomes. Data analysed via statistical analysis software and ranked a value of importance to each of attributes.	Attributes perceived to be the most positive in hiring are: professionalism, communication, problem solver, learner, patient care, self-aware and teamwork. Attributes with the least impact on hiring were: business operations, innovation and marketing. At least 15% of respondents identified attributes lacking in the pool of candidates: innovator, leader, problem solver, communication, marketing, business operations, and teamwork and business manager.	General business management Retail operations Problem solving Innovation	Communication Empathy Leadership Professionalism Teamwork Self-awareness Customer care	Marketing and promotion Professional development

<p>Ram S., et al., (2015)¹ New Zealand</p> <p>Summary rating: ★★★</p>	<p>To determine the perceptions of pharmacy employers in relation to the knowledge, skills and abilities a pharmacy manager should possess for employment.</p>	<p><u>Semi-structured interviews:</u> Pharmacy employers (n=12) Interviews conducted by fourth year pharmacy students. Demographic information collected. Eleven questions in total discussing effective management, behaviours, leadership, hiring, training, tertiary education, recent graduates and the future of the profession.</p> <p>Audi-recorded semi-structured interviews transcribed and thematically analysed with major themes emerging.</p>	<p>Pharmacy management was defined as three components: human, technical and conceptual. Human (ethical, empathy, trust) and technical (business acumen, professional development) skills were more required than conceptual skills (larger perspective, general management skills and relationship networking). Problems were identified with the routine use of external management consultants due to the need for balance between a healthcare and business environment.</p>	<p>General business management Organisational skills Problem solving Networking and relationships Larger perspective Pharmacy operations</p>	<p>Ambition Communication Empathy Ethics Leadership Professionalism Teamwork Self-driven Customer care Stress management</p>	<p>Business acumen Professional development</p>
<p>Augustine J., et al., (2018)²⁰ U.S.A.</p> <p>Summary rating: ★★★</p>	<p>To determine important business management and human resource skills that are required for pharmacy graduates.</p>	<p><u>Focus groups:</u> Pharmacy preceptors (n=4 groups – n=27 participants)</p> <p>Demographics questionnaire followed by open-ended questions on business management regarding the skills that were most critical for new graduates and how to teach these skills.</p> <p>Audio-recorded, transcribed and categorised using a data dictionary.</p>	<p>Business management themes that preceptors perceived as being most important were communication, business skills, decision making, time management, conflict resolution, leadership, professionalism, personnel management, and information technology.</p>	<p>General business management Organisational skills Business planning Problem solving Innovation Larger perspective</p>	<p>Ambition Communication Conflict resolution Customer care Empathy Leadership Professionalism Self-awareness Teamwork Time management Personnel management Stress management</p>	<p>Business acumen Business models Financial analysis Marketing and promotion Professional development Technology</p>

<p>Davies J., (2013)⁴⁷ U.K.</p> <p>Summary rating: ★★★</p>	<p>To describe how pharmacists spent their time using a work sampling method, with the view of expanding the pharmaceutical services currently provided by the profession.</p>	<p><u>Quantitative:</u> <u>Fixed-interval work sampling</u></p> <p>Pharmacists (n=10)</p> <p>Observers recorded activities of a pharmacist every minute and recorded into 18 activity codes. Data analysed by calculating the number of observations for a single activity, then expressing them as a proportion of the total number of observations.</p>	<p>Pharmacists spend the majority of their time assembling and labelling medications. The shift to a patient focus is not evident as there is minimal time recorded on this role. Pharmacists recorded to perform many management roles including; communication, staff training, teamwork and financial analysis.</p>	<p>Inventory management General business management Retail operations Networking and relationships Problem solving</p>	<p>Communication Personnel management Professionalism Customer care Leadership</p>	<p>Financial analysis Marketing and promotion</p>
<p>Ottewill R., et al., (2000)⁵⁰ U.K.</p> <p>Summary rating: ★★★</p>	<p>To investigate the core skills required for management in community pharmacy and highlight potential training methods to acquire the skills.</p>	<p><u>Semi-structured interviews:</u> Pharmacists (owner or manager n=6)</p> <p>Interviews questions explored what skills community pharmacists need to be successful; relationships between professional and management competencies in pharmacists; developing the required skills in pharmacists and the future of pharmacy.</p> <p>Interviews transcribed in real time. Transcripts reduced and analysed based on coding and clustering themes.</p>	<p>No relationship between managerial training and small and medium enterprise business performance. Skills required for pharmacy management defined into a framework: strategic level and operational level. Equipping pharmacists with managerial skills cannot be at the expense of clinical expertise. Professional and management need to be mutually recognised in the curriculum and expose student to negotiation, risk taking, strategy and general management core skills.</p>	<p>Inventory management Pharmacy operations General business management Retail operations Organisational skills Business planning Problem solving Networking and relationships Innovation Entrepreneurship Retail operations Larger perspective</p>	<p>Adaptability Ambition Communication Conflict resolution Customer care Ethics Leadership Self-driven Personnel management Professionalism Teamwork</p>	<p>Business acumen Financial analysis Marketing and promotion Pharmacy law Professional development</p>
<p>O'Brien E., et al., (2017)⁵¹</p>	<p>To compare survey responses regarding desirable skills in</p>	<p><u>Survey:</u> Pharmacists (n = 147)</p>	<p>Both pharmacists and students agree on essential skills required for pharmacy.</p>	<p>General business management</p>	<p>Communication Conflict resolution</p>	<p>Pharmacy law</p>

U.S.A. Summary rating: ★★★	new pharmacists; from perspectives of pharmacists and students.	Students (n = 77) Likert scale and open questions. Analysed via descriptive statistics. Nominal data analysed with Chi-square tests. Fisher exact test used to compare qualitative open question responses.	Communication skills was a notable difference in opinion and improvement in the curriculum recommended.		Ethics Professionalism Time management	
Hermansyah A., et al., (2012) ⁶⁴ Indonesia Summary rating: ★★★	To determine the professional and non-professional roles of community pharmacists	<u>Questionnaire:</u> Pharmacists (n=30) Descriptive, cross sectional study design. Questionnaire covered demographic information, professional and non-professional work. Data analysis to provide descriptive results and completed with Wilcoxon signed rank test (calculating difference between ideal and actual time).	Business management roles of pharmacists include communication, professionalism, general management, marketing and promotion, personal management and networking. It was concluded that more emphasis and time was required to be allocated to these roles.	General business management Pharmacy operations Retail operations Networking and relationships	Communication Personnel management Professionalism Customer care	Marketing and promotion Financial analysis Professional development
Jacobs S., et al., (2013) ⁶⁶ U.K. Summary rating: ★★★	To explore the structures for identifying and managing performance in U.K. community pharmacists.	<u>Semi-structured interview:</u> Pharmacy managers (n = 20) <u>Interviews</u> were approximately 30 minutes duration, audio recorded, transcribed and thematically analysed using a coding frame.	Business performance was prioritised, along with some aspects of professional performance. Larger organisation pharmacies had mechanisms to identify performance concerns, with the ability to provide support and training.	General business management Pharmacy operations	Self-driven Personnel management Professionalism Team work Communication Time management Stress management Leadership Self-awareness	Professional development

<p>O'Sullivan T., et al., (2017)⁶⁷ U.S.A.</p> <p>Summary rating: ★★★</p>	<p>To design an alternate curriculum to prepare pharmacy students to be a pharmacist-in-charge.</p>	<p><u>Semi-structured interview:</u> Pharmacy stakeholders (n=11)</p> <p><u>Focus groups:</u> Pharmacy stakeholders (n=11 groups – 31 participants) Audio-recorded interviews and focus groups were transcribed and analysed for common themes needed in community pharmacy training.</p>	<p>The expectation of employers, to have management competent pharmacists can be met with the implementation of an experimental education curriculum.</p>	<p>General business management Pharmacy operations Problem solving Networking and relationships Organisational skills Innovation</p>	<p>Communication Ethics Self-driven Leadership Time management Professionalism Empathy Adaptability Customer care</p>	<p>Financial analysis Pharmacy law</p>
<p>Sealy, P., et al., (2013)⁶⁸ West Indies</p> <p>Summary rating: ★★★</p>	<p>To explore pharmacist stakeholder's views of recent graduate's performance in the workforce and identify curricula deficiencies.</p>	<p><u>Questionnaire:</u> Pharmacy stakeholders (n=10); Likert scale (1-5) Analysed with one-sample t tests, with an hypothesised mean value of 2.5.</p> <p><u>Focus groups:</u> Pharmacy stakeholders (n=2 groups – 11 participants) Videotaped and transcribed. Summary of group discussions determined by consensus.</p>	<p>Stronger business management skills in comparison to clinical knowledge. Strengths in attitude, teamwork, adaptability and communication. Weakness in ability to apply theoretical knowledge, leadership and teamwork.</p>	<p>Inventory management General business management Organisational skills Problem solving Innovation</p>	<p>Adaptability Ambition Communication Empathy Ethics Self-driven Leadership Professionalism Teamwork Time management Self-awareness</p>	<p>Technology Pharmacy law Professional development</p>
<p>Latif D., (2002)¹⁶ U.S.A.</p>	<p>To identify and discuss a teaching framework that could be employed</p>	<p><u>Commentary:</u> A review of the literature on effective management skills in addition to providing the</p>	<p>All pharmacists will be placed in a position of management. Inclusion of management skills training in the curriculum will</p>	<p>Inventory management Organisational skills Business planning</p>	<p>Adaptability Ambition Communication</p>	<p>Financial analysis Technology</p>

<p>Summary rating: ★</p>	<p>to educate pharmacy students on business management skills. To evaluate current knowledge of effective management skills, and discuss innovative methods of teaching pharmacy students.</p>	<p>description of a model to teach pharmacy management in the curriculum.</p> <p>Topics discussed within the commentary are the management skills pharmacists require, how to gain the skills/behaviours for effective management and how tertiary educators can improve these revealed skills/behaviours in pharmacy students</p>	<p>not only benefit to the team they work with, but to the student themselves. In order for students to learn management skills, more time in the curriculum will need to be allocated then current business teaching methods.</p>	<p>Problem solving Networking and relationships Larger perspective Entrepreneurship</p>	<p>Conflict resolution Empathy Leadership Affinity to role repetitiveness Self-driven Professionalism Stress management Self-awareness Teamwork Time management Confidence Personnel management</p>	
<p>Singleton J. Nissen L., (2014)²⁵ Australia</p> <p>Summary rating: No stars</p>	<p>To investigate alternative business models for independent community pharmacies to remain financially successful in a hypercompetitive environment.</p>	<p><u>Commentary:</u> The Australian community pharmacy market is deemed hypercompetitive. Small and independent community pharmacy management need to implement and deliver professional health services to remain financially viable. Expertise in business management is the blueprint to display a difference in the marketplace and deliver the right clinical services to remain successful into the future.</p>	<p>Pharmacy owners and managers can differentiate their business strategy in the market via targeting cognitive professional services (CPS). Pharmacy owners' primary training is healthcare and privileging the business skills to adapt and innovate can be daunting. Communication, innovation, leadership, market research and a clear differentiation in the strategy of the business operations are fundamental attributes a pharmacy manager require to be successful in a hypercompetitive environment.</p>	<p>General business management Innovation Problem solving Pharmacy operations Business planning</p>	<p>Adaptability Communication Leadership Professionalism Teamwork Time management Customer care</p>	<p>Business acumen Financial analysis Marketing and promotion Professional development Technology Business model diversity</p>

- 1 **Table 2:** Pharmacy students' perceptions of skills and aptitudes required in pharmacy management. Summary rating provides an overall assessment of
- 2 published articles of the skills and aptitudes required in pharmacy management as per Newcastle-Ottawa scale of assessment⁶³, see Table 4 for more
- 3 details.

Author(s)	Aim(s)	Methodology	Findings	Skills and aptitudes		
				Conceptual	Human	Technology
Bullock, K.C., Horne, S., (2019) ⁶⁹ U.S.A. Summary rating: ★★★★★★	To design, teach and evaluate a didactic Doctor of Pharmacy (PharmD) course to improve the skills of students in both clinical and business management.	<u>Surveys:</u> Students (n=18) Likert scale responses (1-5) and open-ended questions Wilcoxon signed-rank test for significant difference between pre-post responses	Comparing students' skills and knowledge pre-and post-test; student ratings were significantly higher for communication, leadership and legal considerations. There was limited change in the field of 'business management'.	General business management Pharmacy operations	Communication Customer care Ethics Leadership Self-driven	Financial analysis Marketing and promotion Pharmacy law Professional development
Rollins B., et al., (2012) ⁷⁰ U.S.A. Summary rating: ★★★★★★	To determine the effect of didactically teaching 17 pharmacy management topics to students via pre- and post-course self-test evaluation.	<u>Surveys:</u> Students Pre-course (n=210) Post-course (n=218) Likert scale responses (1-5); Pre- and post-course survey. Analysis via mean value and standard deviation.	Pharmacy students perceived their knowledge of business management t improved after didactic learning of the material. Across all 17 business management topics, students responded they improved significantly in their knowledge.	Inventory management General business management Pharmacy operations	Personnel management	Financial analysis
Slavcev R., et al., (2016) ⁴ Canada	To design a pharmacy business education program to meet current practice requirements in	<u>Surveys:</u> Course evaluation by students (n=53)	A mixed method business program can positively improve pharmacy student's knowledge, skills	General business management Organisational skills Business planning	Adaptability Ambition Communication Confidence	Financial analysis Prior experience

<p>Summary rating: ★★★★★</p>	<p>business, strategic management, leadership and entrepreneurial training.</p>	<p>Pre-and post-course surveys. Statistical analysis of pre- and post-course results calculated and represented as a percentage.</p>	<p>and attitude towards pharmacy business management.</p>	<p>Problem solving Entrepreneurship Innovation</p>	<p>Self-driven Leadership Professionalism</p>	
<p>Gatwood J., et al., (2018)⁵³ U.S.A. Summary rating: ★★★★★</p>	<p>To evaluate the perceptions of pharmacy students completing a pharmacy business planning project being undertaken from two separate methods (traditional and experimental).</p>	<p><u>Mixed method:</u> <u>Surveys</u> (n=121) Students Likert scale (1-5) questions. Differences in responses analysed by Mantel-Haenszel test for linear trends. <u>Focus groups</u> (n=34 participants) Students who completed the experimental project invited in a focus group. Participants discussed project choice, likes/dislikes and the perceived opinions on the experience. Audio-recordings transcribed and entered into NVivo. Thematic analysis conducted using open coding and</p>	<p>Students approached the business project by a traditional method (design a pharmacy-related business plan in a team of students), or an innovate method (design a pharmacy-related business plan paired with a pharmacy focus firm). Students from the experimental approach responded with a better understanding of business management, a greater ability to connect management concepts in relation to professional practice and gained benefit from a real-world experience.</p>	<p>Business planning Problem solving Larger perspective Innovation Entrepreneurship</p>	<p>Adaptability Communication Confidence Self-driven Teamwork Time management</p>	<p>Professional development</p>

		axial coding, to generate major themes.				
Fejzic J., Barker M., (2015) ⁵⁶ Australia Summary rating: ★★★★★	To discover the perceptions of pharmacists and students in regards graduate 'work readiness' for pharmacy practice.	<u>Surveys:</u> Students (n=71) Pharmacy students (2011) responded to a 'work ready' survey in lecture. The survey was pre-set criteria for students to answer. Data analysis via tabulating the pre-set criteria and associated frequency of responses (most to least).	Similarities between pharmacists' and students' opinions, but there was a shift towards graduates being more work ready for business management skills to grow the pharmacy and implement innovative services.	Organisational skills Problem solving Pharmacy operations	Communication Adaptability Ambition Customer care Empathy Ethics Self-driven Professionalism Teamwork	Prior experience Professional development
Davies M., et al., (2013) ¹⁷ U.K. Summary rating: ★★★★★	To study the perceptions of community pharmacists, students and academic staff within the U.K. in regards to the content and delivery of business management course in the MPharm degree.	<u>Questionnaire:</u> Students (n=441) Both multiple choice (Likert scale) and open-answer questions. Data analysed by simple frequency tests, cross tabulations and non-parametric techniques.	Majority of pharmacy students (92.8%) agree business management will be required and impact their future. Data from the study concluded business management skills are relevant in community pharmacy, should be taught in the curriculum, specifically leadership interpersonal skills and regulation.	General business management Pharmacy operations Inventory management	Communication Ethics Leadership Teamwork Personnel management Self-awareness Professionalism	Business models Financial analysis Marketing and promotion Pharmacy law
Latif D., (2004) ¹⁸ U.S.A.	To design and teach a management skills course to third year pharmacy students and evaluate the feedback on the	<u>Survey:</u> Students (n=65) Diverse evaluation of students managerial skills (learning and application). Pre- and	Student pre- and post-course survey responses regarding improvement in skills such as problem solving, conflict resolution, personal management and	General business management Problem solving	Communication Conflict resolution Empathy Leadership Personnel	<i>None included</i>

Summary rating: ★★★	improvement in their skills.	post- course survey, with results statistically analysed for improvement. Student feedback in comments, with analysis.	delegation did not significantly change. The students responded to an increased ability to identify their weaknesses and know how to improve a particular area of underperformance.		management Self-awareness Teamwork Time management	
O'Brien E., et al., (2017) ⁵¹ U.S.A. Summary rating: ★★★	To compare survey responses regarding desirable skills in new pharmacists; from the perspectives of pharmacists and students.	<u>Surveys:</u> Pharmacists (n = 147) Students (n = 77) Survey consisted of Likert scale answers and open questions. Analysed via descriptive statistics. Nominal data analysed with Chi-square tests. Fisher exact test used to compare qualitative responses.	Both pharmacists and students agree on essential skills required for pharmacy. Communication skills was a notable difference in opinion and improvement in the curriculum recommended.	General business management	Communication Conflict resolution Ethics Professionalism Time management	<i>None included</i>
Bloom T., et al., (2017) ⁵⁷ U.S.A. Summary rating: ★★★	To explore the impact of pharmacy work experience and the potential benefits to pharmacy students.	<u>Surveys:</u> Student (n=293) Pharmacy students in all 4 years invited to participate. Demographic questions were included. Additional questions surrounded interpersonal	Pharmacy schools educate students didactically to prepare them for a professional pharmacy career. Prior pharmacy work experience to tertiary education may increase the students' professional identity. A higher rating in communication and teamwork appeared to be	Problem solving	Communication Ethics Professionalism Teamwork Self-awareness	<i>None included</i>

		<p>tasks, generic attributes and professional skills.</p> <p>Student responses analysed with descriptive statistics to identify significance between pharmacy work experience and a set list of professional skills</p>	<p>strongly related to prior work experience.</p>			
<p>Patterson B., et al., (2013)⁷² U.S.A.</p> <p>Summary rating: ★★★</p>	<p>To design and teach pharmacy students an elective course on leadership skills using graduate mentors.</p>	<p><u>Qualitative: Thematic analysis of reflection papers:</u></p> <p>Students (n=74)</p> <p>Thematic analysis was based on required elements (e.g., relationship building) using open descriptive coding.</p>	<p>An innovative and cost-effective method of teaching leadership skills to students can be achieved by using post-graduate mentors. Students were positive about the learning experience. Students could differentiate between certain styles of leadership and demonstrated a methodical approach to continual professional development.</p>	<p>Problem solving</p>	<p>Self-driven Leadership Self-awareness Professionalism</p>	<p><i>None included</i></p>
<p>Zgarrick D., Talluto B., (1997)⁵² U.S.A.</p> <p>Summary rating: ★★</p>	<p>To further student's knowledge and application of pharmacy business management via a rotation system working with pharmacy managers.</p>	<p><u>Questionnaire:</u></p> <p>Students (n=14)</p> <p>Evaluation of educational learning. Likert scale responses (1-5) of pre-set criteria. Data analysis via means-based test with standard deviation.</p>	<p>Student evaluation revealed the rotation system between pharmacy management practice was a positive experience. Noted that broad business management skills and application were lacking, rather one or two management areas were prioritised.</p>	<p>Pharmacy operations Organisational skills Business planning Retail operations</p>	<p>Personnel management</p>	<p>Financial analysis Marketing and promotion</p>

<p>Evans C., et al., (2010)⁷¹ U.S.A.</p> <p>Summary rating: No stars</p>	<p>To determine student learning of the knowledge and skills of conflict resolution, customer service, retail theft and communication through actual events from a community pharmacy.</p>	<p><u>Qualitative - case study:</u></p> <p>Interactions from a pharmacy setting designed as novel learning tool enhance students' business management skills.</p> <p>Interactions transcribed from actual events that transpired in a community pharmacy. Primarily focussed on conflict resolution and how to approach resolving issues that arise from the case study.</p>	<p>Evaluation of a real pharmacy case is a method that students can learn and understand how to best apply business management skills in a relatable setting.</p>	<p>Retail operations General business management</p>	<p>Communication Conflict resolution Customer care Professionalism Time management Empathy</p>	<p><i>None included</i></p>
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1 **Table 3:** Summary of the assignment of all identified management skills and aptitudes to a reduced set of
 2 terms. Proportions were calculated as the number of occurrences divided by the total number of studies (Total
 3 publications: Students=12, Pharmacy stakeholders=19, Note: 3 publications overlap and are included in both
 4 the student and pharmacy stakeholder counts).

Management skills and aptitudes identified from studies	Management skill or aptitude	Student total	Pharmacy stakeholder total	Student proportion	Pharmacy stakeholder proportion
Conceptual					
Generic business management, human resources, management, materials management, evaluation, rosters, assigning tasks, dealing with mail, filing, clerical work, merchandising, having business management skills, knowing how to get goals achieved, theft prevention and legal action.	General business management	7	16	0.58	0.84
Problem solving and critical thinking, decision making, reasoning, methodological, troubleshooting.	Problem solving	6	13	0.50	0.68
Operations specific to pharmacy, opening/closing procedures, specific requirements for community pharmacy operation, clinical expertise and knowledge to perform the role, knowledge of the working of the industry.	Pharmacy operations	5	12	0.42	0.63
Organisational skills, planning, logical systems, goal setting, clear objectives.	Organisational skills	3	10	0.25	0.53
Innovation, creative ideas, adapt to change, imaginative.	Innovation	2	8	0.17	0.42
Business planning, planning new pharmacy operations/viability, expansion/ growth succession planning, short and long-term planning, disaster planning, facilities and equipment planning, construction, renovations, strategic planning, succession planning.	Business planning	3	7	0.25	0.37
Inventory management, dispensary stock control, front store stock control, merchandising.	Inventory management	2	6	0.17	0.32
Relationship building, health professionals, political level.	Networking and relationships	0	6	0.00	0.32
Retail operations, traffic flow, theft, stock levels, inventory layout, merchandising.	Retail operations	2	5	0.17	0.26

Wholistic perspective, bigger picture.	Larger perspective	1	4	0.08	0.21
Entrepreneurship, risk verse benefit of new opportunities.	Entrepreneurship	2	3	0.17	0.16
Human					
Communication with patients, staff and professional, active listening, use of language, negotiation, writing, cultural sensitivity, effective listening, peer to peer, manager to subordinate, culturally aware.	Communication	9	18	0.75	0.95
Professionalism, behaviour, integrity, trust, attitude, mannerism, punctuality, not being arrogant or overconfident.	Professionalism	7	18	0.58	0.95
Leadership and a desire to do so, assertiveness, confidence power and influence, respect, getting the best out of people and acknowledging their strengths, empower people, mentoring.	Leadership	5	15	0.42	0.79
Teamwork/ delegation, team builder.	Teamwork	5	14	0.42	0.74
Customer service, customer care, provider mentality, patient advocate.	Customer care	3	12	0.25	0.63
Self-awareness, strengths and weaknesses, knowing when to ask for help/ limitations, take responsibility for evaluation of one's own work, social intelligence, competitive, reflective.	Self-awareness	4	11	0.33	0.58
Personnel management, personable, staff training, hiring, education of work experience students, educator, motivation, mentoring, dispensary staff, front of store staff, directing people, coaching, growth and development.	Personnel management	4	10	0.33	0.53
Ethics, act and behave in an ethical manner, have in inherent sense of right and wrong, environmental impact conscious.	Ethics	5	10	0.42	0.53
Initiative/self-motivation, independence/ proactive, enthusiasm, flair, right attitude, passion for pharmacy, positive, dedicated.	Self-driven	5	10	0.42	0.53

Adaptability, change agile, make change effectively.	Adaptability	3	8	0.25	0.42
Empathy towards staff, customers and health professionals.	Empathy	3	8	0.25	0.42
Time management, efficiency.	Time management	4	8	0.33	0.42
Ambition -motivation, risk taking, competitiveness, desire to succeed within the profession.	Ambition	2	7	0.17	0.37
Conflict resolution, conflict management, conflict between professional and non-professional roles, company policy verse professional duty, staff conflict, role conflict, humility, conflict handling for specific situations.	Conflict resolution	3	5	0.25	0.26
Stress management, deal with unpleasant situations without influencing one's emotions, work-life balance.	Stress management	0	5	0.00	0.26
Confidence, impose wishes, accept authority and deliver competently, trust their knowledge and skills, self-confidence.	Confidence	2	3	0.17	0.16
Job repetitiveness.	Affinity to role repetitiveness	0	1	0.00	0.05
Technical					
Remaining up to date, professional development, maintaining a recency of knowledge from literature, career progression, evaluating and improving management skills, reading the professional literature, using mentors and experts to improve, willingness to learn, growth and development.	Professional development	3	13	0.25	0.68
Financial analysis, wages, cash on hand, tax returns, reporting, make decisions based on financial projections, profit versus service, accounts, budgets, assessment of short- and long-term position, cash flow.	Financial analysis	5	11	0.42	0.58
Marketing and promotion, advertising.	Marketing and promotion	3	9	0.25	0.47
Business acumen, business sense	Business acumen	2	2	0.17	0.11
Pharmacy law, pharmacy regulations, regulatory requirements, accreditations.	Pharmacy law	4	10	0.33	0.53

Technology, software, understanding and competent with computer hardware/software, understand when to take advantage of technology advancements in the industry (robotic dispensing), computer software techniques.	Technology	0	6	0.00	0.32
Business models, independent, chain pharmacy, banner group, compounding, understanding between different business structures.	Business model diversity	1	3	0.08	0.16
Work experience opportunities in pharmacy practice, previous experience in management, placement experience in management, life experience.	Prior experience	2	2	0.17	0.11

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- 1 **Table 4:** Assessment of published articles of the skills and aptitudes required in pharmacy
 2 management as per Newcastle-Ottawa scale of assessment⁶³.

		Number of articles		References for articles	
		Stakeholders	Students	Stakeholders	Students
Selection	★★★★★	0	0		
	★★★★	8	1	5,17,32,55,56,58,59,65	17
	★★★	9	9	1,20,47,50,51,64,66,68,74	4,18,51,53,56,57,69,70,72
	★★	1	1	16	52
	No stars	1	1	25	71
Comparability	★★	0	2		69,70,
	★	3	2	32,56,58	4,53
	No stars	16	8	1,5,16,17,20,25,47,50,51,55,59,64-66,68,74	17,18,51,52,56,57,71,72
Outcome	★★★★	0	0		
	★★★	2	5	32,56	4,53,56,69,70
	★★	15	6	1,5,17,20,47,50,51,55,58,59,64-66,68,74	17,18,51,52,57,72
	No stars	2	1	16,25	71
Summary rating	★★★★★★★	2	2	32,56	69,70
	★★★★★★	1	2	58	4,53
	★★★★★	5	2	5,17,55,59,65	17,56
	★★★★	9	4	1,20,47,50,51,64,66,67,68	18,51,57,72
	★★★	0	1		52
	★★	1	0	16	
	No stars	1	1	25	71

1 **Appendix 1**

2 Electronic database search strategy following the preferred reporting items for systematic reviews and meta-
 3 analyses extension for Scoping Reviews (PRISMA-ScR)⁶¹.

Database	Keywords	Limitations	Resulting literature identified	Literature articles included post-screening
ERIC	pharmacy leadership management universities pharmaceutical education	English language	84	5
Emerald/Insight	pharmacy management managerial skills leadership university students	English language	255	2
ABI/Inform	pharmacy* AND management AND (Managerial Skills) AND leadership AND (colleges and universities) AND pharmacist	English language	4225	8
CINAHL	((MH "Students, Pharmacy") AND (MH "Pharmacist Attitudes") AND (MH "Pharmacy Service") AND (MH "Pharmacists") AND (MH "Education, Pharmacy")) AND management skills	English language	34	3
WOS	Pharmacy Management Education Business	English language	16	8
MEDLINE	Pharmacists/ or Pharmacies/ or Community Pharmacy Services/ AND Self-Management/ or Humans/ AND Schools, Pharmacy/ or Education, Pharmacy/ or Pharmacy/ or Education, Pharmacy, Continuing/ or Students, Pharmacy/ or Education, Pharmacy, Graduate/ or Pharmacy Administration/ AND Employment/ or "Attitude of Health Personnel"/ or Curriculum/	English language	504	30
Google Scholar		English language	28	28

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1 Appendix 2

2 Summary of the assignment of all identified management skills and aptitudes to a reduced set of terms.

3 Proportions were calculated as the number of occurrences divided by the total number of studies (Total

4 publications: Students=12, Pharmacy stakeholders=19, Note: 3 publications overlap and are included in both

5 the student and pharmacy stakeholder counts).

Management skills and aptitudes identified from studies	Management skill or aptitude	Student total	Pharmacy stakeholder total	Student proportion	Pharmacy stakeholder proportion
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Problem solving and critical thinking, decision making, reasoning, methodological, troubleshooting.	Problem solving	6	13	0.50	0.68
Operations specific to pharmacy, opening/closing procedures, specific requirements for community pharmacy operation, clinical expertise and knowledge to perform the role, knowledge of the working of the industry.	Pharmacy operations	5	12	0.42	0.63
Organisational skills, planning, logical systems, goal setting, clear objectives.	Organisational skills	3	10	0.25	0.53
Innovation, creative ideas, adapt to change, imaginative.	Innovation	2	8	0.17	0.42
Business planning, planning new pharmacy operations/viability, expansion/ growth succession planning, short and long-term planning, disaster planning, facilities and equipment planning, construction, renovations, strategic planning, succession planning.	Business planning	3	7	0.25	0.37
Inventory management, dispensary stock control, front store stock control, merchandising.	Inventory management	2	6	0.17	0.32
Relationship building, health professionals, political level.	Networking and relationships	0	6	0.00	0.32
Retail operations, traffic flow, theft, stock levels, inventory layout, merchandising.	Retail operations	2	5	0.17	0.26

Wholistic perspective, bigger picture.	Larger perspective	1	4	0.08	0.21
Entrepreneurship, risk verse benefit of new opportunities.	Entrepreneurship	2	3	0.17	0.16
Human					
Communication with patients, staff and professional, active listening, use of language, negotiation, writing, cultural sensitivity, effective listening, peer to peer, manager to subordinate, culturally aware.	Communication	9	18	0.75	0.95
Professionalism, behaviour, integrity, trust, attitude, mannerism, punctuality, not being arrogant or overconfident.	Professionalism	7	18	0.58	0.95
Leadership and a desire to do so, assertiveness, confidence power and influence, respect, getting the best out of people and acknowledging their strengths, empower people, mentoring.	Leadership	5	15	0.42	0.79
Teamwork/ delegation, team builder.	Teamwork	5	14	0.42	0.74
Customer service, customer care, provider mentality, patient advocate.	Customer care	3	12	0.25	0.63
Self-awareness, strengths and weaknesses, knowing when to ask for help/ limitations, take responsibility for evaluation of one's own work, social intelligence, competitive, reflective.	Self-awareness	4	11	0.33	0.58
Personnel management, personable, staff training, hiring, education of work experience students, educator, motivation, mentoring, dispensary staff, front of store staff, directing people, coaching, growth and development.	Personnel management	4	10	0.33	0.53
Ethics, act and behave in an ethical manner, have in inherent sense of right and wrong, environmental impact conscious.	Ethics	5	10	0.42	0.53
Initiative/self-motivation, independence/ proactive, enthusiasm, flair, right attitude, passion for pharmacy, positive, dedicated.	Self-driven	5	10	0.42	0.53

Adaptability, change agile, make change effectively.	Adaptability	3	8	0.25	0.42
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Time management, efficiency.	Time management	4	8	0.33	0.42
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Conflict resolution, conflict management, conflict between professional and non-professional roles, company policy verse professional duty, staff conflict, role conflict, humility, conflict handling for specific situations.	Conflict resolution	3	5	0.25	0.26
Stress management, deal with unpleasant situations without influencing one's emotions, work-life balance.	Stress management	0	5	0.00	0.26
Confidence, impose wishes, accept authority and deliver competently, trust their knowledge and skills, self-confidence.	Confidence	2	3	0.17	0.16
Job repetitiveness.	Affinity to role repetitiveness	0	1	0.00	0.05
Technical					
Remaining up to date, professional development, maintaining a recency of knowledge from literature, career progression, evaluating and improving management skills, reading the professional literature, using mentors and experts to improve, willingness to learn, growth and development.	Professional development	3	13	0.25	0.68
Financial analysis, wages, cash on hand, tax returns, reporting, make decisions based on financial projections, profit versus service, accounts, budgets, assessment of short- and long-term position, cash flow.	Financial analysis	5	11	0.42	0.58
Marketing and promotion, advertising.	Marketing and promotion	3	9	0.25	0.47
Business acumen, business sense	Business acumen	2	2	0.17	0.11
Pharmacy law, pharmacy regulations, regulatory requirements, accreditations.	Pharmacy law	4	10	0.33	0.53

Technology, software, understanding and competent with computer hardware/software, understand when to take advantage of technology advancements in the industry (robotic dispensing), computer software techniques.	Technology	0	6	0.00	0.32
Business models, independent, chain pharmacy, banner group, compounding, understanding between different business structures.	Business model diversity	1	3	0.08	0.16
Work experience opportunities in pharmacy practice, previous experience in management, placement experience in management, life experience.	Prior experience	2	2	0.17	0.11

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Management skills and aptitudes identified from studies	Management skill or aptitude	Students total	Pharmacy stakeholders total	Student proportion	Pharmacy stakeholder proportion
Communication with patients, staff and professional, active listening, use of language, negotiation, writing, cultural sensitivity, effective listening, peer to peer, manager to subordinate, culturally aware.	Communication	9	18	0.75	0.95
Professionalism, behaviour, integrity, trust, attitude, mannerism, punctuality, not being arrogant or overconfident.	Professionalism	7	18	0.58	0.95
Leadership and a desire to do so, assertiveness, confidence power and influence, respect, getting the best out of people and acknowledging their strengths, empower people, mentoring.	Leadership	5	15	0.42	0.79
Generic business management, human resources, management, materials management, evaluation, rosters, assigning tasks, dealing with mail, filing, clerical work, merchandising, having business management skills, knowing how to get goals achieved, theft prevention and legal action.	General business management	7	16	0.58	0.84

Teamwork/ delegation, team builder.	Teamwork	5	14	0.42	0.74
Problem solving and critical thinking, decision making, reasoning, methodological, troubleshooting.	Problem solving	6	13	0.50	0.68
Financial analysis, wages, cash on hand, tax returns, reporting, make decisions based on financial projections, profit versus service, accounts, budgets, assessment of short- and long-term position, cash flow.	Financial analysis	5	11	0.42	0.58
Ethics, act and behave in an ethical manner, have in inherent sense of right and wrong, environmental impact conscious.	Ethics	5	10	0.42	0.53
Initiative/self-motivation, independence/ proactive, enthusiasm, flair, right attitude, passion for pharmacy, positive, dedicated.	Self-driven	5	10	0.42	0.53
Operations specific to pharmacy, opening/closing procedures, specific requirements for community pharmacy operation, clinical expertise and knowledge to perform the role, knowledge of the working of the industry.	Pharmacy operations	5	12	0.42	0.63
Organisational skills, planning, logical systems, goal setting, clear objectives.	Organisational skills	3	10	0.25	0.53
Adaptability, change agile, make change effectively.	Adaptability	3	8	0.25	0.42
Marketing and promotion, advertising.	Marketing and promotion	3	9	0.25	0.47
Innovation, creative ideas, adapt to change, imaginative.	Innovation	2	8	0.17	0.42
Remaining up to date, professional development, maintaining a recency of knowledge from literature, career progression, evaluating and improving management skills, reading the professional literature, using mentors and experts to improve, willingness to learn, growth and development.	Professional development	3	13	0.25	0.68
Ambition -motivation, risk taking, competitiveness, desire to succeed within the profession.	Ambition	2	7	0.17	0.37

Empathy towards staff, customers and health professionals.	Empathy	3	8	0.25	0.42
Business planning, planning new pharmacy operations/viability, expansion/ growth succession planning, short and long-term planning, disaster planning, facilities and equipment planning, construction, renovations, strategic planning, succession planning.	Business planning	3	7	0.25	0.37
Time management, efficiency.	Time management	4	8	0.33	0.42
Conflict resolution, conflict management, conflict between professional and non-professional roles, company policy verse professional duty, staff conflict, role conflict, humility, conflict handling for specific situations.	Conflict resolution	3	5	0.25	0.26
Customer service, customer care, provider mentality, patient advocate.	Customer care	3	12	0.25	0.63
Personnel management, personable, staff training, hiring, education of work experience students, educator, motivation, mentoring, dispensary staff, front of store staff, directing people, coaching, growth and development.	Personnel management	4	10	0.33	0.53
Pharmacy law, pharmacy regulations, regulatory requirements, accreditations.	Pharmacy law	4	10	0.33	0.53
Retail operations, traffic flow, theft, stock levels, inventory layout, merchandising.	Retail operations	2	5	0.17	0.26
Inventory management, dispensary stock control, front store stock control, merchandising.	Inventory management	2	6	0.17	0.32
Wholistic perspective, bigger picture.	Larger perspective	1	4	0.08	0.21
Self-awareness, strengths and weaknesses, knowing when to ask for help/ limitations, take responsibility for evaluation of one's own work, social intelligence, competitive, reflective.	Self-awareness	4	11	0.33	0.58
Confidence, impose wishes, accept authority and deliver competently, trust their knowledge and skills, self-confidence.	Confidence	2	3	0.17	0.16
Business models, independent, chain pharmacy, banner group,	Business model diversity	1	3	0.08	0.16

compounding, understanding between different business structures.					
Entrepreneurship, risk verse benefit of new opportunities.	Entrepreneurship	2	3	0.17	0.16
Work experience opportunities in pharmacy practice, previous experience in management, placement experience in management, life experience.	Prior experience	2	2	0.17	0.11
Business acumen, business sense	Business acumen	2	2	0.17	0.11
Technology, software, understanding and competent with computer hardware/software, understand when to take advantage of technology advancements in the industry (robotic dispensing), computer software techniques.	Technology	0	6	0.00	0.32
Relationship building, health professionals, political level.	Networking and relationships	0	6	0.00	0.32
Stress management, deal with unpleasant situations without influencing one's emotions, work-life balance.	Stress management	0	5	0.00	0.26
Job repetitiveness.	Affinity to role repetitiveness	0	1	0.00	0.05